

Some Unusual Fishes From the Central Pacific

JOSEPH E. KING and ISAAC I. IKEHARA¹

THE PURPOSE OF THIS ARTICLE is to call the attention of ichthyologists to certain rare or uncommon fishes recently collected in the central Pacific by staff members of the Pacific Oceanic Fishery Investigations at Honolulu, and others. These fishes have been deposited with the U. S. National Museum. The photographs included here were taken by E. D. Stroup; Figure 4 was prepared by Tamotsu Nakata.

SQUALIDAE

The first two species, here placed in the Squalidae following Hubbs and McHugh (1951), were formerly placed in the Dalatiidae, e.g. Bigelow and Schroeder (1948).

1. *Euprotomicrus bispinatus* (Quoy and Gaimard)

One female specimen (Fig. 1) (USNM No. 164176), 161 mm. in total length. Collected March 3, 1948, about 340 miles WNW of Johnston Island at 18°24'N., 175°12'W. in water about 1,000 fathoms deep. Attracted to a light and dip-netted at surface. Collected by M. B. Schaefer aboard M/V "Oregon" operated by Pacific Exploration Company.

Description: No anal fin; 2 dorsal fins without spines; snout blunt and broadly rounded; 5 gill openings, all anterior to pectorals; body

nearly cylindrical; eyes lateral without nictitating membrane; a large spiracle present; mouth transverse with a groove extending posteriorly from each end; teeth with only 1 cusp and not serrated; upper teeth narrowly triangular and needle-pointed, lower teeth broader, compressed, and bent outwards; caudal axis scarcely upturned; no subterminal notch evident; end of base of first dorsal fin well in advance of the pelvic insertion; base of second dorsal fin very much longer than that of the first; denticles quadrate, with a central pit; first dorsal fin very much nearer pelvic base than pectoral base; body uniform brownish black (in alcohol after fixation in formalin), outer edges of fins clear. Measurements of the specimen and proportional measurements as per cent of total length are given in Table 1.

Hubbs and McHugh (1951) report the capture of a female *E. bispinatus*, 233 mm. total length, about 500 miles off the California coast. They give a thorough description of the specimen and state that it is ". . . the only extant example of the genus known from the Pacific Ocean and, so far as we know, the only one in an American museum." An earlier specimen collected in the open Pacific "between Honolulu and San Francisco, but nearer to the former" (Eigenmann, 1891) was destroyed in the San Francisco fire, according to Hubbs and McHugh. Since we can find no record of any capture of this species since

¹ Fishery Research Biologists, Pacific Oceanic Fishery Investigations, U. S. Fish and Wildlife Service, Honolulu, T. H. Manuscript received April 13, 1955.

TABLE 1

BODY MEASUREMENTS AND PROPORTIONAL MEASUREMENTS OF *Euprotomicrus bispinatus* AND *Isistius brasiliensis*
(Body Measurements in Millimeters, Proportional Measurements [bracketed] in Percentage of Total Length)

	<i>E. bispinatus</i> *	<i>I. brasiliensis</i> †
Trunk at origin of pectoral: breadth.....	19.0 (11.8)	21.0 (11.1)
height.....	17.0 (10.6)	19.5 (10.3)
Snout length in front of: outer nostrils.....	3.0 (1.9)	1.5 (0.8)
mouth.....	17.0 (10.6)	13.0 (6.9)
Eye: horizontal diameter.....	6.0 (3.7)	8.0 (4.2)
Mouth: breadth.....	11.0 (6.8)	10.5 (5.6)
height.....	1.0 (0.6)	0.0 (0.0)
Nostrils: distance between inner ends.....	4.0 (2.5)	3.0 (1.6)
Labial furrow length from angle of upper jaw.....	8.0 (5.0)	11.0 (5.8)
Gill opening lengths: 1st.....	2.0 (1.2)	2.0 (1.1)
2nd.....	2.0 (1.2)	2.0 (1.1)
3rd.....	2.0 (1.2)	2.0 (1.1)
4th.....	1.5 (0.9)	1.5 (0.8)
5th.....	1.0 (0.6)	1.0 (0.5)
First dorsal fin: vertical height.....	2.5 (1.6)	4.0 (2.1)
length of base.....	2.5 (1.6)	6.0 (3.2)
Second dorsal fin: vertical height.....	3.3 (2.0)	4.0 (2.1)
length of base.....	14.0 (8.7)	7.0 (3.7)
Caudal fin: upper margin.....	25.0 (15.5)	27.0 (14.3)
lower anterior margin.....	20.0 (12.4)	20.0 (10.6)
Pectoral fin: outer margin.....	16.5 (10.2)	16.0 (8.5)
inner margin.....	10.5 (6.5)	11.0 (5.8)
distal margin.....	13.0 (8.1)	6.8 (3.6)
Distance from snout to: 1st dorsal.....	84.0 (52.2)	115.5 (61.1)
2nd dorsal.....	108.0 (67.1)	136.5 (72.2)
upper caudal.....	137.0 (85.1)	164.0 (86.8)
pectoral.....	40.0 (24.8)	42.0 (22.2)
ventrals.....	94.0 (58.4)	122.5 (64.8)
Interspace between: 1st and 2nd dorsals.....	21.0 (13.0)	16.7 (8.8)
2nd dorsal and caudal.....	16.0 (9.9)	20.5 (10.8)
Distance from origin to origin of: pectoral and ventrals.....	56.5 (35.1)	84.5 (44.7)
ventrals and caudal.....	41.0 (25.5)	41.0 (21.7)

* Female, 161 millimeters in total length.

† Female, 189 millimeters in total length.

1951, we believe that our specimen is the third example of the genus (monotypic) known from the Pacific and the second example in an American collection.

2. *Isistius brasiliensis* (Quoy and Gaimard)

One male specimen (USNM No. 164173), 165 mm. in total length. Collected March 2,

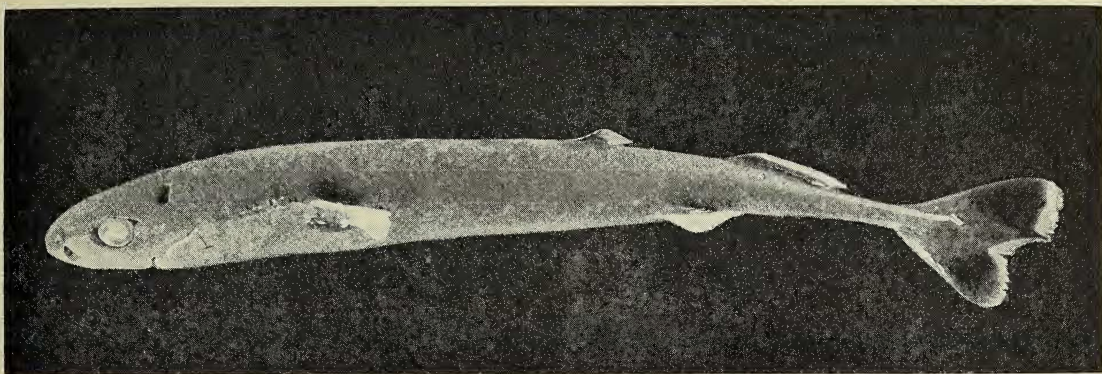


FIG. 1. Lateral view of a 161 millimeter (female) *Euprotomicrus bispinatus* captured at the surface with a dip net at 18°24'N., 175°12'W.



FIG. 2. Lateral view of a 189 millimeter (female) *Isistius brasiliensis* captured by pelagic trawl at 2°09'N., 158°14'W.

1952, at about 11 P.M. aboard M/V "Hugh M. Smith" at 2°04'S., 168°57'W., in water about 3,000 fathoms deep. Collected by Heeny Yuen employing a 1-meter (mouth diameter) zooplankton net in an oblique haul to 200 meters depth.

A female specimen (USNM No. 164175), 179 mm. in total length. Collected May 23, 1954, at about 8:30 P.M. aboard M/V "John R. Manning" at 4°47'N., 161°04'W., in water about 2,000 fathoms deep. Collected by J. E. King and T. S. Hida in a 6-foot Isaacs-Kidd trawl; depth of haul about 100 meters.

A second female (Fig. 2) (USNM No. 164174), 189 mm. in total length. Collected

June 2, 1954, at about 8:30 P.M., aboard M/V "John R. Manning" at 2°09'N., 158°14'W., in water about 1,000 fathoms deep. Collected by J. E. King and T. S. Hida in a 6-foot Isaacs-Kidd trawl with depth of haul about 100 meters. Measurements of this specimen are given in Table 1.

Description: No anal fin; 2 dorsal fins, without spines; snout blunt and broadly rounded; 5 gill openings, all anterior to pectorals; body nearly cylindrical; eyes lateral, without nictitating membrane; a large spiracle present; teeth with only 1 cusp and faint indications of serration; teeth of the upper and lower jaw very unlike, the upper are slender and curved

outwards while the lower are much larger and erect, with subquadrate bases and triangular sharp-pointed cusp; caudal axis scarcely upturned; subterminal notch in caudal fin slight; mouth transverse, with fleshy lips and a groove extending backwards and outwards from each end; unlike *E. bispinatus*, the first dorsal fin is displaced backward so that the end of its base is over the origin of the pelvic base; dorsal fin bases nearly equal; denticles quadrate with a median pit; first dorsal fin very much nearer pelvics than pectoral base; body dark brown above (in alcohol after fixation in formalin), pale grayish brown below except for a dark collar across the throat; fins with outer edges clear except the upper lobe of the caudal, which is brown to the margin.

This small oceanic shark, although uncommon, is not nearly as rare as *E. bispinatus*. According to Bigelow and Schroeder (1948), *I. brasiliensis* is distributed throughout the tropical and subtropical belts of all three oceans; however, records of its occurrence in the eastern and central Pacific are few. One specimen was taken by the "Albatross" (Garman 1899) at 2°34'N., 92°06'W. F. D. Bennett (1840) captured two specimens, which he classified as *Squalus fulgens*, in a net towed at the surface; one of these, 10 inches in length, he reported as taken at 2°30'S., 163°W., and the other, 18 inches in length, at 55°N., 110°W. Garman (1899) pointed out the obvious error in the latter position and stated that the actual longitude was 140°W. Later G. Bennett (1860) collected a 5.5-inch specimen, which he classified as *Scymnus* sp., at 2°15'S., 163°W. Jordan and Jordan (1922) report the occurrence of this small shark in Hawaiian waters under the name *Apristurus spongiceps* (Gilbert). Fowler and Ball (1925) state that a specimen classified earlier (Fowler 1923) as *Echinorhinus brucus* (Bonnatere) in Bernice P. Bishop Museum collections from Hawaiian waters is actually *I. brasiliensis*. All the above names are placed in synonymy with *I. brasiliensis* by Bigelow and Schroeder (1948).

The Bennetts' description of the lumin-

iscence of this fish has been quoted often. This characteristic was not observed in our three specimens, possibly because all three were dead when brought on deck. The luminescence is reported to fade out as the fish dies.

LOPHOTIDAE

3. *Eumecichthys fiski* (Günther) Regan

One specimen (Figs. 3 and 4) (USNM No. 164170), 598 mm. in standard length. Collected June 1, 1954, at about 12:15 P.M. aboard M/V "John R. Manning" at 3°04'N., 159°13'W., in water about 900 fathoms deep. Dip-netted at the surface by Howard Kamauu, fisherman on the "Manning."

Description: Body elongate, strongly compressed, nearly of uniform depth throughout, scaleless, snout prolonged as a sword-shaped process bearing near its tip a pronounced plume or crest (Fig. 3); dorsal fin commences at the tip of this process with an extremely long and compressed ray, then continues to the caudal averaging in height about one-fourth the body depth; both jaws are armed with small, hooked teeth; premaxillary non-protractile; eye large; no ventral fins; anal fin rudimentary, base about 3 mm., height less than 1 mm. (Fig. 4); body silvery (in alcohol after fixation in formalin) with about 30 dark bars or blotches, most prominent dorsally; occipital crest and dorsal and caudal fins were crimson in life but faded completely in formalin.

Fin ray count: D. 326; P. 13(R), 12(L); C. 10.

Body measurements (in millimeters) and proportional measurements (bracketed) as percentage of standard length: snout to vent, 579.0 (96.7); vent to base of caudal, 20.5 (3.4); caudal fin length, 25.5 (4.3); head length including snout, 64.0 (10.7); snout length in front of mouth, 30.0 (5.0); snout to origin of pectoral, 64.0 (10.7); greatest body height, 21.3 (3.6); greatest body breadth, 7.0 (1.2); pectoral fin length, 13.0 (2.2); pectoral fin base, 5.0 (0.8); dorsal fin height at mid-point of body, 6.0 (1.0); dorsal fin

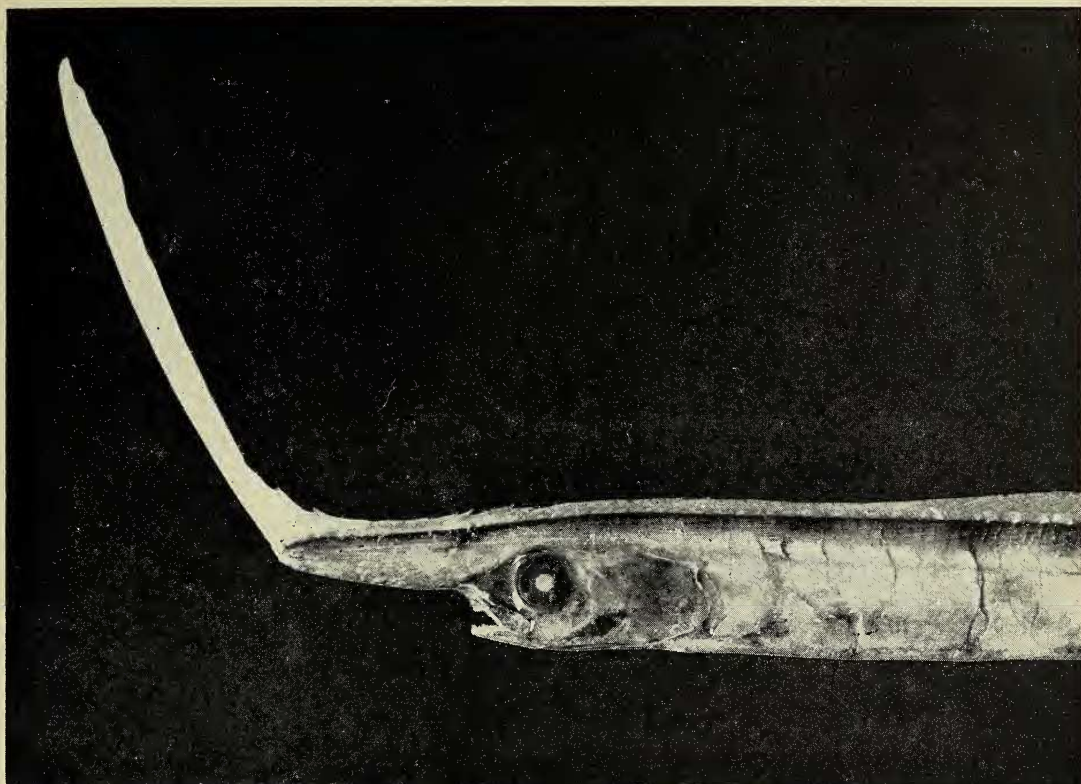


FIG. 3. Head portion of a 625 millimeter specimen of *Eumecichthys fiski* captured at the surface in a dip net at $3^{\circ}04'N.$, $159^{\circ}13'W.$

height at origin of pectoral, 4.0 (0.7); dorsal fin height above vent, 5.0 (0.8); crest height, 83.0 (13.9); eye diameter, 8.0 (1.3).

Details of the capture of this rare fish are perhaps of interest. About midday shortly after starting to haul longline, we (J. E. King and T. S. Hida) noticed a thin "shadow" near the surface just to the rear of the point where the line was emerging from the water. When we finally decided that this was not just the

wake or the shadow of the line but an unusual object in the water, a dip net was hastily obtained and this very rare fish was scooped from the water. After it had lain on a canvas hatch cover for a few minutes, we noticed that a black fluid had been discharged from the vent. Kershaw (1909) and Griffin (1934) have reported that lophotid fishes may emit an inky fluid from the vent when captured.

Eumecichthys fiski was described by Günther (1890) as *Lophotes fiski* from a 50-inch specimen that washed up on the shore of Kalk Bay (Atlantic Ocean), South Africa. In this fish the caudal region was mutilated so that Günther did not know the nature of the caudal fin nor whether or not an anal fin was normally present. Apparently no additional examples had appeared in South Africa by the time of the recent revision of "The Sea Fishes

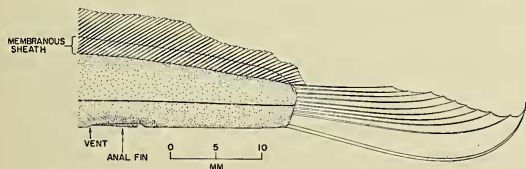


FIG. 4. Tail portion of *Eumecichthys fiski*, same specimen as in Figure 3, with the caudal fin expanded to show the detailed structure of the fin.

of South Africa" by Smith (1953). From our examination of available literature, we conclude that all subsequent collections of *E. fiski*, except for our specimen from the central Pacific, have been from Japanese waters. Kamohara (1949) states that "In Japan a specimen 88.1 cm. in length was collected off Kōchi in 1939 by a worker from the Kōchi Prefectural Fisheries Experiment Station and was reported by Dr. Kiyomatsu Matsubara. This was the first record from Japan. Thereafter it transpired that several specimens had been captured in 1937 off Hagi in Yamaguchi Prefecture, and that it had also been collected earlier in Wakayama Prefecture." [Translated from the Japanese by W. G. Van Campen.] There is no reference to this species in *The Fishes of Oceania* (Fowler, 1928) and its supplements, or in *The Fishes of the Indo-Australian Archipelago*, Vol. V (Weber and De Beaufort, 1929), which includes the *Allotriognathi*.

TRACHYPTERIDAE

4. ? *Trachypterus iris* (Walbaum)

Two specimens (USNM No. 164172), both juveniles; one 84 mm. in standard length (caudal fin broken), the other 109 mm. in standard length (146 mm. total length with caudal depressed to the horizontal). Collected May 4, 1953, at about 8 P.M. aboard M/V "John R. Manning" at 8°32'N., 150°12'W., in water about 2,700 fathoms deep. Collected by W. F. Royce and W. M. Matsumoto in a 10-foot Isaacs-Kidd trawl; depth of haul about 200 meters.

Description: Body elongate, strongly compressed, scaleless; dorsal fin extends length of body; caudal fin divided, the larger portion pointing upwards; rays of dorsal bear numerous spinules; lateral line spinous; vent located on mid-ventral line in contrast to the following species; anterior profile steep, almost vertical; mouth protractile; body pale colorless (in alcohol after fixation in formalin).

Fin ray count: D. 160 = 2; P. (broken); V. 5; C. 7 (upper), 5 (lower).

Body measurements (in millimeters) and proportional measurements (bracketed) as percentage of standard length (109 mm.): snout to vent, 70.0 (64.2); vent to base of caudal, 42.0 (38.5); caudal fin length, 34.0 (31.2); greatest body height, 18.0 (16.5); greatest body breadth, 6.0 (5.5).

5. ? *Trachypterus woodi* Smith

One specimen (Fig. 5) (USNM No. 164171), a juvenile, 113 mm. standard length (125 mm. in total length with caudal depressed to the horizontal). Collected May 25, 1954, at about 8:30 P.M. aboard M/V "John R. Manning" at 4°41'N., 159°53'W., in water about 2,000 fathoms deep. Collected by J. E. King and T. S. Hida in a 6-foot Isaacs-Kidd trawl; depth of haul about 100 meters.

Description: Body strongly compressed; dorsal fin extends length of body; rays of dorsal with numerous spinules, each ray with a pair of larger spines near its base; rays at anterior end of dorsal show evidence of having been prolonged but are now broken; anterior profile steep but less than vertical; body covered with small, smooth tubercles, particularly prominent in the ventral region; lateral line spinous; no anal fin; caudal fin turned upwards, with no downward projecting portion as in previous specimen; vent located on left side of body about 2 mm. above mid-ventral line (the asymmetrical location of vent in *T. misakiensis* was pointed out by Herre and Herald in 1950); body silvery (in alcohol after fixation in formalin) with scattered dark blotches below dorsal and perhaps seven small blotches extending posteriorly in a line beginning at the upper margin of the eye; fins pink in life, clear in alcohol.

Fin ray count: D. 144, P. 12, V. 9, C. 8.

Body measurements (in millimeters) and proportional measurements (bracketed) as percentage of standard length: snout to vent, 78.5 (69.5); vent to base of caudal, 34.0 (30.0); caudal length, 12.5 (11.0); head length, 22.0 (19.4); eye diameter, 7.3 (6.4); snout to origin pectorals, 19.0 (16.7); snout to origin ven-

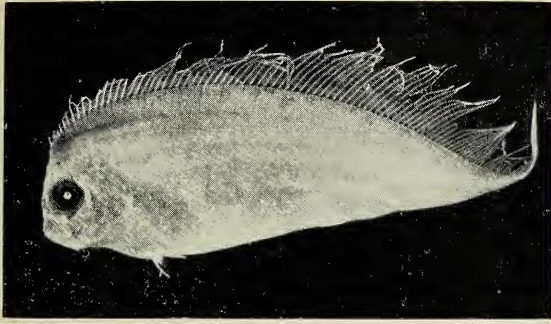


FIG. 5. Lateral view of ?*Trachypterus woodi* Smith captured by pelagic trawl at 4°41'N., 159°53'W.

trials, 23.0 (20.3); greatest body height, 38.0 (33.5); greatest body breadth, 8.0 (7.0); greatest height of dorsal fin, 18.0 (15.9).

Most of the trachypterids examined by ichthyologists have been washed up on shore and usually were in poor condition; our specimens are among the few to be collected in nets, and one of the three, at least, is in excellent condition. These fishes are noted for their change in body proportions during development after the postlarval period (Hubbs, 1926). The juveniles are particularly difficult to identify. On the basis of available literature we have decided that two of our specimens are most likely *T. iris* (Walbaum), which is principally a Mediterranean species, whereas the third resembles *T. woodi* Smith. Although the identification is not certain due to limited library facilities and lack of sufficient reference material, our description, measurements, and the accompanying figure may provide some worthwhile information to those who are interested in the life history of these unusual fishes.

REFERENCES

- BENNETT, F. D. 1840. *Narrative of a whaling voyage round the globe, from the year 1833 to 1836*. Vol. 2. vii + 395 pp. Richard Bentley, London.
- BENNETT, G. 1860. *Gatherings of a naturalist in Australasia*. xii + 456 pp. John Van Voorst, London.

- BIGELOW, H. B., and W. C. SCHROEDER. 1948. Sharks. In: *Fishes of the western North Atlantic*. Part I. *Sears Found. Mar. Res., Mem.* 1: 59-576.
- EIGENMANN, ROSA S. 1891. Description of a new species of *Euprotomicrus*. *Calif. Acad. Sci., Proc.* II, 3 (1): 35.
- FOWLER, H. W. 1923. New or little-known Hawaiian fishes. *Bernice P. Bishop Mus., Occas. Papers* 8 (7): 375-392.
- 1928. The fishes of Oceania. *Bernice P. Bishop Mus., Mem.* 10: 1-540.
- FOWLER, H. W., and S. C. BALL. 1925. Fishes of Hawaii, Johnston Island, and Wake Island. *Bernice P. Bishop Mus., Bul.* 26: 1-31.
- GARMAN, S. 1899. Reports on an exploration off the west coasts of Mexico, Central and South America, and off the Galapagos Islands, in charge of Alexander Agassiz, by the U. S. Fish Commission steamer "Albatross" during 1891, Lt. Commander Z. L. Tanner, U. S. N., commanding. XXVI. The fishes. *Harvard Univ., Mus. Compar. Zool., Mem.* 24: 1-431.
- GRIFFIN, L. T. 1934. Description of a rare lophotid fish from Cape Runaway, New Zealand. *Auckland Inst. and Mus., Rec.* 1 (5): 239-243.
- GÜNTHER, A. C. L. 1890. Description of a new species of deep-sea fish from the Cape (*Lophotes fiski*). *Zool. Soc. London, Proc.* 1890: 244-247.
- HERRE, A. W., and E. S. HERALD. 1950. Noteworthy additions to the Philippine fish fauna with descriptions of a new genus and species. *Philippine Jour. Sci.* 79 (3): 309-340.
- HUBBS, C. L. 1926. The metamorphosis of the California ribbon fish, *Trachypterus rex-salmonorum*. *Mich. Acad. Sci., Arts, and Letters, Papers* 5 (1925): 469-476.
- HUBBS, C. L., and J. L. MCHUGH. 1951. Relationships of the pelagic shark *Euprotomicrus bispinatus*, with description of a specimen from off California. *Calif. Acad. Sci., Proc.* IV, 27 (6): 159-173.

- JORDAN, D. S., and E. K. JORDAN. 1922. A list of the fishes of Hawaii, with notes and descriptions of new species. *Carnegie Mus., Mem.* 10 (1): 1-92.
- KAMOYARA, T. 1949. *Deep-sea fishes*. 203 pp. Nippon Shuppansha, Osaka. [Translated in part by W. G. Van Campen.]
- KERSHAW, J. A. 1909. Additions to the fish fauna of Victoria. No. 2. *Victorian Nat.* 26: 78-79. [Not seen.]
- REGAN, C. T. 1907. On the anatomy, classification, and systematic position of the teleostean fishes of the sub-order Allotriognathi. *Zool. Soc. London, Proc.* 2: 634-643.
- SMITH, J. L. B. 1953. *The sea fishes of southern Africa*. xvi + 564 pp. Central News Agency, Ltd., Cape Town.
- WEBER, M., and L. F. DEBEAUFORT. 1929. *The fishes of the Indo-Australian Archipelago*. Vol. 5. xiv + 458 pp. E. J. Brill, Leiden.